U.S. ENVIRONMENTAL PROTECTION AGENCY
CURRENT STATE OF BALLAST WATER MANAGEMENT
TECHNICAL DEVELOPMENT DOCUMENT OUTLINE

JUNE 23, 2016

1. **Introduction**
    a. Overview of why and how vessels add ballast water
    b. Ballast water sources
        i. Freshwater, saltwater, brackish water
        ii. Source locations (Overseas, Coastal, Great Lakes, etc.)
    c. Ballast water impacts
        i. Environmental damage caused by Aquatic Nuisance Species (ANS)
        ii. Socioeconomic damage caused by ANS

2. **Ballast Water Regulations/Requirements to Prevent ANS Introduction and Propagation**
    a. Overview of laws to address ANS
    b. IMO requirements
        i. Performance Standards
        ii. Type approval process and status of revisions
        iii. International ratification and status
    c. USCG Regulations
        i. Applicability and Exemptions
        ii. Ballast Water Management Requirements
            i. Implementation schedule (including extensions)
            ii. Compliance Options (BWMS, alternate management systems (and status), onshore treatment, public water supply, no discharge)

iii. Discharge Standards

iv. Nonindigenous species reduction practices (includes BWM plans and required practices in 33CFR151.2050)

iii. Ballast water management system type approval process and status (including number approved, systems in the queue, viability versus dead)

iv. Practicability Review

v. Shipboard Technology Evaluation Program

d. EPA Vessel General Permit requirements

i. Ballast water management plans

ii. Mandatory ballast water management practices

iii. Ballast water discharge limitations

i. Compliance alternatives (BWTS, onshore treatment, public water supply, no discharge) and exemptions (short-distance, barges, Lakers, small)

ii. Schedule and status (EPA low enforcement priority)

iii. Interim requirements

iv. Fishing vessels and commercial vessels less than 79 feet moratorium

v. Additional Requirements specific to the Great Lakes

i. Laker BMPs

ii. Ballast water exchange and flushing for overseas vessels (Salties)

vi. Requirements for individual states of Indian country lands

e. Transport Canada

f. State Requirements (outside the VGP)

3. **Ballast Water Management Considerations**

a. Availability of U.S. type approved ballast water treatment systems

b. Revisions to the ETV protocol for U.S. type approval testing

c. USCG extensions

d. Exemptions for Lakers built before 2009

e. Replacement of IMO type certified ballast water management systems

4. **Vessel Universe**

   a. Number of vessels impacted by US and IMO ballast water management regulations

      i. U.S. flagged vessels by vessel type (bulker, cargo, tanker, barges, passenger, etc.)

      ii. Foreign flagged vessel by vessel type (bulker, cargo, tanker, barges, passenger, etc.)

   b. Characteristics of commercial vessel impacted by US and IMO ballast water regulations

      i. Length and tonnage of vessels by vessel type

      ii. Average age of vessels by vessel type

      iii. Ballast water capacity by vessel type

   c. Voyage patterns for commercial vessels impacted by US and IMO ballast water regulations.

      i. Vessels entering U.S. waters from overseas

      ii. Vessels that remain in U.S. coastal waters

      iii. Vessels entering the Great Lakes form outside the EEZ

      vi. Vessels confined to the Great Lakes (i.e. Lakers).

5. **Best Management Practices**

   a. Practices or procedures

   b. Relationship to WQBELs

6. **Ballast Water Treatment Principals**

   a. Treatment system intent

b. Treatment system unit operations

c. Treatment system design consideration

    i. Salinity

    ii. Ambient water temperature

    iii. Typical voyage duration

    iv. Size (space and weight)

    v. Power requirements

d. Treatment system operational considerations

    i. Operational frequency

    ii. Operational complexity (labor, chemicals)

    iii. Maintenance requirements

7. **Commercially Available Ballast Water Treatment Systems**

    a. Summary of ballast water treatment systems having AMS acceptance

    b. Additional ballast water treatment systems without AMS

    c. Vessel applicability

8. **Ballast Water Management System Performance**

    a. IMO and USCG Type Approval requirements

    b. Summary of IMO Type Approval testing data

    c. IMO Type Approval data quality issues

    d. Long-term performance data

9. **Ballast Water Management System Costs**

    a. Capital costs

i. Purchase and installation of ballast water management systems for new vessels

ii. Purchase and installation of ballast water management systems on existing vessels

b. Annual costs

i. Labor for ballast water management system operation

ii. Energy for ballast water management system operation

iii. Chemical costs for ballast water management system operation

iv. Monitoring costs for ballast water management system operation

10. **Compliance Monitoring**

a. Sampling considerations

i. Accessing ballast water tanks

ii. Volume of ballast water needed for analysis

iii. Collection of representative samples from multiple ballast tanks

iv. On-board testing or off-ship laboratory analysis

b. Analytical methods

i. Ballast water treatment functionality monitoring

- BWTS sensors

- - Summarize and describe submitted data and data quality

ii. Techniques for measurement of living organisms in ballast water samples

iii. New sensor technologies (e.g., in-line fluorescence, ATP)

iv. Measurement of treatment residuals in discharges (e.g., in-line chlorine sensors)

11. **Off-ship Ballast Water Treatment**

a. Alternatives for off-ship treatment

b. Design considerations for off-ship reception facilities

    i. Vessel applicability

    ii. Ballast water volume and duration of discharge

    iii. Number and location of ballast water reception facilities per port

    iv. Freshwater or saltwater discharge

    v. On-site treatment or municipal treatment (e.g., POTW)

    vi. Environmental conditions (cold climates)

c. Current availability of off-ship reception facilities

d. Costs to construct and operate off-ship reception facilities

e. Practicality of off-ship ballast water treatment including the pros and cons

12. **Ballast Water Alternatives**

    a. Permanent ballast

    b. On-board potable water generation

    c. Ballasting with municipal potable water

    d. CLIA work – zero discharge alternative

13. **References**